

**COMPARISON OF THE PERFORMANCE OF THE FOREHAND KICK (STRAIGHT AND ACCOMPANIED BY FORWARD ROTATION) IN TERMS OF ACCURACY AND SPEED AMONG THE PLAYERS OF THE NATIONAL TEAM (ADVANCED CATEGORY) IN TENNIS**

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### **Abstract**

The purpose of this paper is to identify the comparison of the performance of the forehand (straight and accompanied by forward rotation) in terms of accuracy and speed among the players of the national team (advanced category) in tennis. The researchers used the descriptive approach for its suitability and the nature of the research, the researchers chose the research sample from the men's national team for the advanced category, which numbered 4 players, who were chosen by the Iraqi Tennis Federation for the year (2017-2018) as being the best sample was chosen in an intentional way for the purpose of serving the objectives of the research, where the sample represents the part that represents the original community, which will be the percentage of the selected sample (100%). One of the most important results reached by the researcher is that: It appeared to us that the speed of the forehand (straight) groundstroke exceeded the velocity of the forehand groundstroke (accompanied by forward rotation), and it appeared to us that the accuracy of the frontal (straight) groundstroke was superior to the accuracy of the frontal groundstroke (accompanied by the forward rotation). One of the most important recommendations recommended by the researchers is that: The coaches pay attention to training the forehand kick (straight) as it is the most accurate and fastest for advanced players, and conducting similar research and studies in the skill of the forehand strike for young age groups to identify these mistakes at an early stage.

**Keywords:** forehand straight kick - speed - accuracy - tennis

### **Introduction**

The world is witnessing a great development in all fields, especially in the field of sports, as the individual's ability to move and physical performance has exceeded expectations in recent years, especially in racket games, and this is what prompted many researchers to study this behavior for the purpose of reaching the athlete to an advanced level in performance, and since every structure depends on the foundation from which it was started, as well as sports, each game

depends on its basic skills, and the player who reaches high levels must have a sound foundation in the game he plays.(Saadi, A., & Nezar, 2020)

Therefore, sports training was not the only station that raises the athlete to a good level, but it was necessary to pay attention to other sciences that would develop the level of performance of tennis skills,(Nazar, T., & Aladdin, 2018) including kinetic analysis, which is considered an applied science and helps in understanding some of the causes of errors , which the players fall into and discover, and then work on laying down scientific and training foundations that help correct these errors and then develop the basic skills that will develop the athletic level and achieve a better achievement. The front because of the importance of this skill in the game of tennis.(Fadel et al., 2021)

### **Research problem:**

The forehand kick is one of the main kicks in the tennis game, which plays a very important role in the player's performance and the development of his level if it is used well and ideally through all performance variables.Through the researchers' follow-up to local and international championships and watching most of the national team exercises and by participating in most of the local tournaments, it was noted that this skill that is used straight and in frontal rotation has a difference in terms of the motor path to perform these two methods of performance in addition to the use of this skill in the process of attacking in front of the opponent More than a defensive strike, and therefore these things affect the player's performance level in terms of accuracy and speed.

### **Research objective:**

- Identifying the comparison of the performance of the forehand (straight and accompanied by forward rotation) in terms of accuracy and speed among the players of the national team (advanced category) in tennis

### **Research hypotheses:**

- There are statistically significant differences in the accuracy and speed of performance of the forehand groundstroke (straight and accompanied by forward rotation) and the accuracy and speed of performance of the national team players (advanced category) in tennis.

### **Research fields:**

- Human field: 2Players of the national men's tennis team (advanced category) and they are four players.
- Time field: (1/3/2018) to (1/4/2018)
- Spatial field: Armenian club stadium.

### **Theoretical studies**

#### **Forehand straight ground kick (Al-Atwi and Al-Zuhairi (2009))"**

It is called a straight kick because there is no rotation in the ball while hitting it, as the kick starts from a stand ready to receive the ball and the player takes the side position with the left shoulder facing the net, then the hitting arm is swung back with the weight of the body

transferred on the back foot and the knee is slightly bent and when hitting The ball The player swings the striking arm towards the ball and then transfers the weight of the body to the front foot and the knee is slightly bent. As for the surface of the racket, it is perpendicular to the ground, just as the moment the ball collides with the racket in front of the front toes, then the whole body moves to follow the movement of the racket in a smooth manner, taking into account the movement of the left arm a little before touching the ball in a reverse direction to maintain the balance of the body Figure (1) shows the ground stroke Straight front.

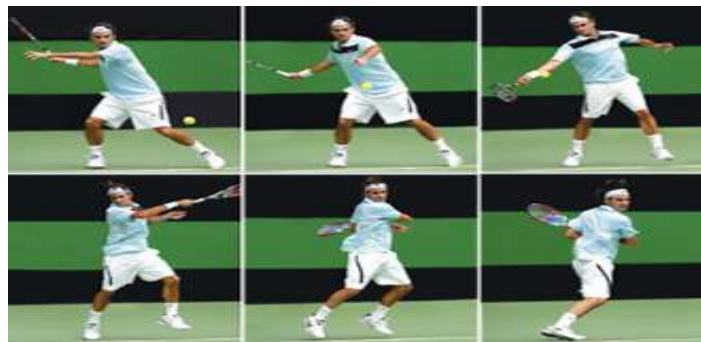


Figure (1)

Shows the kinematic sequence of the forehand kick

#### **Forehand ground kick with forward rotation: (Al-Atwi and Al-Zuhairi, 2009)**

It is called forward rotation because the ball is accompanied by a forward rotation while hitting the ball. From the bottom to the top when it touches the ball and the extension of the beating goes with a simple rotation from the wrist joint forward over the ball, which gives it a forward rotation movement, and at the end of the movement, the movement of the racket is a follow-up to the direction of movement, that is, forward and up, taking into account the movement of the left arm a little before touching the ball in a reverse direction to maintain On the balance of the body Figure (2) shows the forehand stroke accompanied by the forward rotation.



Figure (2)

Forehand ground kick with forward rotation

### **Determinants of the success of the forehand strike:**

#### **Speed:**

The speed of the forehand kick is the instantaneous speed of the ball launching the moment the racket leaves a certain launch angle so that the ball reaches the opponent's area in the least possible time, and it means speed from the point of view of biomechanics (distance / time).

And (Dixon, 1996) confirmed, "The strong starting force results in a large forward thrust, which results in a velocity of launch in the air," and this indicates that the greater the force, the greater the value of the velocity, and it is worth noting that the starting velocity is decomposed into Two vehicles (vertical and horizontal), as the amount of these two vehicles affects the value of the starting angle.

The velocity of the ball falls under the classification of transitional velocity and is considered transitional velocity (a form of velocity, which is moving from one place to another with the maximum possible speed, ie, overcoming a certain distance in the shortest possible time).

This variable is of particular importance in tennis courts because it determines the player's ability to deliver the ball to the place he wants to deliver it to in the shortest possible time, as the speed of the ball's launch is one of the factors that directly affect the result of the forehand kick and then affects the results of runs and the match.

#### **Accuracy**

Accuracy "means the efficiency in hitting the target," and Helmy Hussein defined accuracy as "the ability to control voluntary movements to direct one thing towards another" (Hussain, 1985).

The success of the forehand kick and dropping the ball into the opponent's court while playing, the accuracy of the forehand kick is in directing the ball to the exposed areas of the opposing player in order to get a point or embarrass the opposing player. Accuracy is a special and important quality of a tennis player that must be taken care of like all other qualities.

Accuracy in its scientific sense means directing the movements made by the individual towards a specific goal, and this requires high efficiency from the muscular and nervous systems, as well as the safety of the senses, in addition to that it requires full control over the voluntary muscles, and this was confirmed by (Hassanein, 1995) "Accuracy requires control Complete on the voluntary muscles to direct them around a specific target, as it is required that the neural instructions coming to the muscles from the nervous system be tightly directed, whether they are directed to the working muscles or the corresponding muscles, so that the movement leads in the desired direction with the accuracy necessary to hit the target. Measuring the degree of accuracy, as he said, "Accuracy in sports fields should be measured according to the nature of play." In addition to experience, accuracy needs extensive training to reach the ability to control the motor system and then master the specific skill.

### **Research methodology and field procedures:**

#### **Research Methodology:**

The researchers used the descriptive approach for its suitability and the nature of the research.

**Community and sample research:**

The researchers chose the research sample from the men's national team for the advanced category, which numbered 4 players, who were chosen by the Iraqi Tennis Federation for the year (2017-2018) as being the best

The sample was chosen in an intentional way for the purpose of serving the objectives of the research, where the sample represents the part that represents the original community, which will be the percentage of the selected sample (100%).

**Means of collecting information, devices and tools used:**

**Means of collecting information:**

- Arab and foreign references and sources.
- Observation and analysis.
- The International Information Network (Internet).
- Auxiliary staff

**Equipment and tools used:**

- Ball throwing device.
- One Chinese-made radar.
- Colored adhesive tape.
- Electric car number 12.
- 4 tennis rackets.
- 12 balls.
- Tennis Court.

**Field research procedures:**

On Wednesday (1/3/2018), the main experiment was conducted on the members of the research sample by conducting an accuracy test for the straight forehand groundstroke accompanied by forward rotation and approved by the International Tennis Federation. The researchers adopted this test after taking an opinion, (Experts specialized in the field of tennis), each player made (6) attempts towards the areas of accuracy, and all the sample members used the right hand to perform the forehand kick, and the researchers and the assistant team recorded the data.

**Statistical methods:** The search data was processed through the Statistical Package for the Social Sciences (SPSS).

**Results and discussion:**

Table (1) shows the arithmetic means, standard deviations, the calculated (T) value, the level of error, and the significance of the differences between the two research groups in the tests of speed and accuracy of the front ground strike (straight - and with forward rotation)

variables	Measuring unit	Arithmetic mean	Standard deviation	T value calculated	Level Sig	Type Sig
Ball speed (straight)	km/h	109.867	4.005	1.756	0.110	Non sig
accuracy (straight)	Degree	2.500	1.225	0.904	0.388	Non sig
The speed of the ball accompanied by the forward rotation	km/h	108.267	11.023	1.191	0.261	Non sig
Accuracy ball accompanied by the forward rotation	Degree	1.500	1.225	0.426	0.679	Non sig

\* Significant at the error level (0.05) if the error level is less than (0.05)

Table (1) shows the results of the (T) test between the group executing the straight ground kick and the group carrying out the front ground kick by spinning in the ball speed test for the front ground kick, with random differences, as the calculated (T) value was (1.756), while the level of error was ( 0.110), which indicates the randomness of the differences between the two groups at the level of error (0.05) and in front of the degree of freedom (10).

As for the ball accuracy test in the forehand ground kick, the differences in the results of the (T) test were random between the two research groups, as the calculated (T) value was (0.904), while the level of error was (0.388), which indicates the randomness of the differences between the two groups. At the error level (0.05) and in front of the degree of freedom (10).

In the ball speed test in the forehand groundstroke accompanied by the forward rotation, the differences in the results of the (T) test were random between the two research groups, as the calculated (T) value was (1.191), while the level of error was (0.261), which indicates the randomness of the differences between the two groups. The two groups are at the level of error (0.05) and in front of the degree of freedom (10).

As for testing the accuracy of the ball in the forehand strike accompanied by the forward rotation, the differences in the results of the (T) test between the two research groups were random, as the calculated (T) value was (0.426), while the level of error was (0.679), which indicates the random differences between the two groups. At the error level (0.05) and in front of the degree of freedom (10).

**Discussing the results of the arithmetic mean difference test (T-test) between the two research groups in the tests of speed and accuracy of the forehand groundstroke (straight and diagonal):**

Table (1) shows the random differences in the speed and accuracy of the frontal ground stroke, which is straight and accompanied by the forward rotation, and for the two research groups. This is the result of continuous training in the skill, and the fact that the two skills, the straight frontal strike and the forward rotation, are almost similar in terms of technique, and the technique is nothing but the application of mechanical conditions that when combined represent

a performance technique (Williams, 2011),(Moayed, A., Moayed, G., & Jawad, 2019) what prompted the random differences in all the variables, and the superiority of the front straight ground stroke in measuring the speed was the result of the end of the movement of the striking arm in a forward direction because the head of the racket is directed in a straight motor path, which gives the ball a high speed compared to the performance of the front hit by the front rotation, where the head of the racket is in The main movement is its direction from the bottom to the top when it comes into contact with the ball,(mohammed , Y., & Sabeeh, 2022) and the striking extension continues with a simple rotation of the wrist joint forward over the ball, which gives it a forward rotational movement, and this movement leads to a lower speed.(Mondher, H. A., & Khalaf, 2023) In performing the straight front ground stroke, when the arm and racket are swinging, the movement will consist of several parts in the kinetic chain, and each part of it contributes to achieving the total speed at the end of the lever to achieve the highest linear velocity on the circumference of the circle on which the racket is moving, (Sareeh and Wahbi, 2012) (Mousa, A. M., & Kadhim, 2023)As for the accuracy, the difference was small in the performance of the front straight kick and the front kick accompanied by forward rotation because the speed was linked with accuracy, (Mahmood et al., 2023)(Tawfeq, A., & Jalal, 2023)that is, the speed was increased at the expense of accuracy,(jawad kadhim, M., & Mahmood, 2023) but the slight difference in favor of the straight kick because the kinetic sequence of the skill begins and ends with the same weighting. Which leads to hitting the ball with the head of the racket at the same point, which gives the ball the correct direction and better accuracy, unlike what happens when performing the forehand strike by forward rotation, where the head of the racket moves from the bottom to the top by moving the wrist joint and the ball hits the racket in an unspecified place, which reduces the accuracy the hit .(Jawad, M., & Jabbar Shinen, 2016)

The topic of testing has attracted considerable attention in the tennis performance literature(Qasem, & Sabah (2018), and the energetic and skill demands of tennis have also been studied extensively providing a considerable understanding of the game challenges (Qassim, S. (2019)). In this context, (Shakir, Z. (2018) the main objective of this research topic is to assist in the provision of insight on this area by including a series of novel studies that contribute to the acquisition of further theoretical and practical knowledge which can offer new perspectives for research as well as a direct application on-court.( Qassim, S. (2014).

Crucial to the testing process is the use of normative values as done b(2018)who explored the shoulder rotation strength and range of motion of boys' and girls' junior players and presented a normative database for these aspects(.2018) . This seminal study showed age and sex differences in both the isometric internal rotation, weakness in external rotation, as well as eccentric external rotation in these competitive athletes. Following the findings from Reid and Schneiker (Hussein,.2021) this research emphasised the relevance of strength development through puberty specifically in ' tennis players.(Moayed, 2016)

The use of technology is gradually becoming a must in the assessment of tennis players(Qaddoo, 2023) However, its application in the provision of information related to the

psychological components of the game is still in progress due to the complex nature of mental skills identification in competitive settings. This trend is clearly shown in the study conducted by (Dhiab, 2020) who explored the detection of the achievement of the “zone” in elite players using off-the-shelf wearable technology. They used a neural network to predict the achievement of this state of optimal (Easa et al., 2022) performance at a relatively low cost. Their findings were successfully applied in a real-life scenario combining wearable technology, expert labels, and machine learning, which could provide all interested with a suitable alternative to the detection of psychological states in tennis players. (Tawfeeq, A., & Jalal, 2019)

### **Conclusions and Recommendations:**

#### **Conclusions:**

- It appeared to us that the speed of the forehand (straight) groundstroke exceeded the velocity of the forehand groundstroke (accompanied by forward rotation).
- It appeared to us that the accuracy of the frontal (straight) groundstroke was superior to the accuracy of the frontal groundstroke (accompanied by the forward rotation).

#### **Recommendations:**

- The coaches pay attention to training the forehand kick (straight) as it is the most accurate and fastest for advanced players.
- Conducting similar research and studies in the skill of the forehand strike for young age groups to identify these mistakes at an early stage.

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## Appendix (1)

### The front kick accuracy test

Forehand Accuracy Test: (Dixon, 1996)

Test name: Forehand stroke accuracy.

Test objective: To measure the accuracy of forehand strikes.

Tools: tennis court, tennis balls, tennis rackets, dyes for marking test areas, registration form, stopwatch, basket of balls.

procedures:

1. At the beginning of the test, it must be ensured that the participants have completed their warm-up and are ready to take the test.
2. (6) balls are awarded to the player from the front side only, and the player must hit (3) balls with a straight ground kick inside the single court, and (3) balls of a ground kick accompanied by a forward rotation inside the single court, as in Figure (17).
3. Evaluation points are calculated in light of where the ball falls in the first accuracy rebound.
4. A ball thrower was used to control the variables.
5. Radar is used to measure the speed.

Registration method:

1. One point is awarded if the ball lands in zone one.
2. Two points are awarded if the ball lands in area two.
3. Three points are awarded if the ball lands in the number three area.